Michael Henry Patrick O'Brien

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Expertise

- Ten years' experience in the implementation and management of competitively-awarded fisheries research grants, necessitating self-education in modern modeling and analysis techniques across multiple computer languages
- Self-motivation and ability to balance multiple concurrent projects
- Expert knowledge of R and working knowledge of Python and SQL dialects (SQLite, OGR SQL)
- Experimental design and predictive modeling (esp. generalized mixed models), including spatial modeling utilizing GIS products within ArcGIS and R
- Large-data management, mining, and visualization utilizing R, Python, and SQL
- Video and image analysis through scripting of Open Source Computer Vision Library (OpenCV; Python) and FFmpeg (command line) programs
- Scientific communication through directed public outreach, social media, and web-based data visualization applications

Education

2013 M.S. Fisheries Science; University of Maryland, College Park
2009 B.S. Marine and Atmospheric Science; University of Miami

Professional Background

July 2017 — Present

Faculty Research Assistant III

Fish Movement Ecology, Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science, Solomons, MD, USA.

Selected Projects

2020-present *Spawning movement behaviors, habitat dependencies and run size of Nanticoke River (Marshyhope Creek) Atlantic sturgeon*. Grantor: NOAA Species Recovery Grants to States

- Self-taught OGR SQL dialect and well-known text spatial representation to process large spatial objects, including habitat polygons and fish biotelemetry data, outside of active memory
- Processing of side-scan sonar and Adaptive Resolution Imaging Sonar (ARIS) using OpenCV

2018-2020 *Persistent Aquatic Living Sensors: Telemetry-Aided Living Sensors.* Grantor: US Department of Defense, Defense Advanced Research Projects Agency, Biological Technologies Office

- Application of random forest machine learning (implemented in R) to create an alert system triggered by fish movement
- Video fish movement tracking using self-taught OpenCV (Python) and FFmpeg (command line) scripting
- Self-taught SQLite dialect for rapid processing of real-time fish biotelemetry movement data

- Co-authorship in two peer-reviewed products: a final report to the Defense Advanced Research Projects Agency and a peer-reviewed journal article

2016-2019 *Movement and habitat selection by migratory fishes within the Maryland Wind Energy Area and adjacent reference sites*. Grantor: US Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs.

- Developed self-taught expertise in generalized additive mixed modeling, interpretation, and visualization in R, focusing on fish habitat selection and propagation of underwater ultrasonic signals
- Self-taught use of the Stan language for Bayesian generalized mixed modeling
- Conducted direct outreach to area fishers, including nearly 200 co-working vessel-hours
- Lead authorship of a journal article currently in review, preprint available here
- Co-authorship of three peer-reviewed products: a final report to the Bureau of Ocean Energy Management and two peer-reviewed journal articles

2016-2019 *Spawning Behavior and Ocean Migrations by Hudson River Striped Bass*. Grantor: Hudson River Foundation

- Application of dynamic time warping (self-taught in R) for unsupervised, machine-learning-based discrimination of spawning grounds based on telemetered fish movement
- Co-authorship of a peer-reviewed journal article

Professional Services

- Steering committee; Mid-Atlantic Acoustic Telemetry Observing System
- Sustainability committee; Chesapeake Biological Laboratory

December 2016 – July 2018

World Rugby Referee

HSBC 7s Series, World Rugby, Dublin, IRE.

- Coordination with peers to achieve a common goal across multiple, worldwide time zones
- Rapid conflict resolution in high-pressure situations
- Performance after long-haul international travel in locations such as Dubai, Cape Town, Hong Kong, Singapore, and Vancouver

Professional Services

- National Panel Referee, United States of America Rugby Football Union (2016-present)
- President, Mid-Atlantic Rugby Referees (2019-present)
- Training committee, Potomac Society of Rugby Football Referees (2018-present)

September 2013 – June 2017

Faculty Research Assistant II

Fish Movement Ecology, Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science, Solomons, MD, USA.

Selected Projects

2014-2017 *Size-specific and Seasonal Patterns of Emigration, and Chesapeake Bay and Coastal Habitat-use by Potomac River Striped Bass*. Grantor: Atlantic States Marine Fisheries Commission

- Management and processing of large biotelemetry datasets utilizing R
- Use of parallel computing in large-data modelling and processing

- Utilization of generalized linear mixed models (self-taught and applied in R) to model movement and migration of an anadromous fish species
- Co-authorship of a peer-reviewed journal article

2014-2016 *Determining Habitat Use by Marine Mammals and Ambient Noise Levels Using Passive Acoustic Monitoring Offshore of Maryland*. Grantor: US Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs.

- Fabrication and maintenance of acoustic hydrophone and biotelemetry moorings
- Application of generalized linear models (self-taught and applied in R) to model coastal distribution of harbor porpoises
- Co-authorship of a peer-reviewed journal article

Professional Services

- Creation and maintenance of TelemetryR, an R package to interface with the Atlantic Cooperative Telemetry Network
- Creation and maintenance of University of Maryland Center for Environmental Science (UMCES), Chesapeake Biological Laboratory functions to access water quality data from the Chesapeake Bay Program

Recent Curated Datasets, Publications, and Reports

O'Brien, MHP, Secor, DH, 2020. Influence of thermal stratification and storms on acoustic telemetry detection efficiency: a year-long test in the US Southern Mid-Atlantic Bight. Preprint available: manuscript in review. https://doi.org/10.21203/rs.3.rs-64036/v1. (Associated analysis found here)

Secor, DH, **O'Brien, MHP**, et al. 2020. Multiple spawning run behavior and population consequences in migratory striped bass *Morone saxatilis*. Manuscript in review. (Associated analysis found here)

O'Brien, MHP et al. 2020. Data from: Multiple spawning run behavior and population consequences in migratory striped bass Morone saxatilis, v3, Dryad, Dataset. doi:10.5061/dryad.6hdr7sqxt.

Secor, DH, Lyubchich, V, **O'Brien, MHP**, Testa, JC, Carroll, A, and Bailey, H, 2020. Persistent Aquatic Living Sensors: Telemetry-Aided Living Sensors, final report. US Department of Defense, Defense Advanced Research Projects Agency, Biological Technologies Office. HR001118S0027-PALS-FP-014. (Associated analysis unavailable due to Controlled Unclassified Information restrictions)

Wiernicki, CJ, **O'Brien, MHP**, et al. 2020. The recurring role of storm disturbance on black sea bass (Centropristis striata) movement behaviors in the Mid-Atlantic Bight. Manuscript in press at PloS ONE. (Associated analysis found here)

Rothermel, ER, Balazik, MT, Best, JE, Breece, MW, Fox, DA, Gahagan, BI, Haulsee, DE, Higgs, AL, **O'Brien, MHP**, Oliver, MJ, Park, IA, and Secor, DH, 2020. Comparative migration ecology of striped bass and Atlantic sturgeon in US Southern mid-Atlantic bight flyway. PLoS ONE 15(6): e0234442. (Associated analysis found here)

Rothermel, ER, **O'Brien, MHP**, Secor, DH, 2020. Comparative migration ecology of striped bass and Atlantic sturgeon in the US Southern Mid-Atlantic Bight flyway, v2, Dryad, Dataset. doi:10.5061/dryad.6hdr7sqx3.

Secor, DH, **O'Brien, MHP**, Gahagan, BI, Watterson, JC and Fox, DA, 2020. Differential migration in Chesapeake Bay striped bass. PLoS ONE 15(5): e0233103. (Associated analysis found here)

Secor, DH, Zhang, F, **O'Brien, MHP** and Li, M, 2019. Ocean destratification and fish evacuation caused by a Mid-Atlantic tropical storm. ICES Journal of Marine Science, 76(2). doi:10.1093/icesjms/fsx241. (Associated analysis found here)